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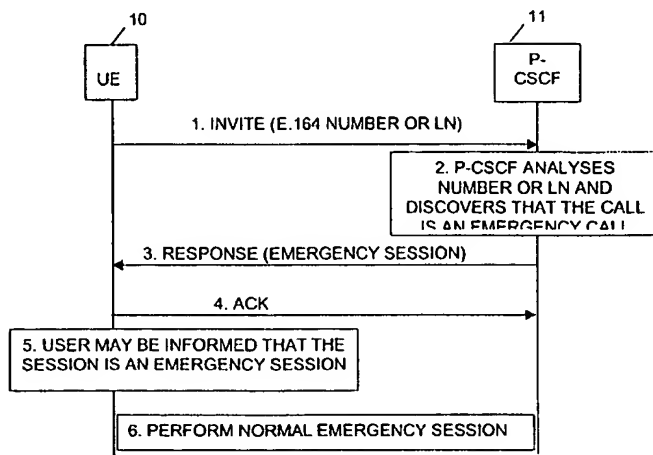
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(54) Title: **METHOD AND SYSTEM FOR HANDLING A NETWORK-IDENTIFIED EMERGENCY SESSION**



(57) Abstract: The invention relates to a method and system for establishing an emergency session in a communication system which includes at least one user equipment and one or more network entities involved in establishing an emergency session. When the user equipment initiates a session by sending a message to a network entity indicating an identifier, e.g. the call number or logical name of a called entity, one of said network entities analyses the received identifier. When detecting that the session to be initiated is an emergency session, an information is returned to the user equipment for informing the latter that the initiated session is an emergency session. The user equipment thereupon initiates the execution of an emergency session. Thus, even when the user equipment is unable to detect, by itself, that the intended session is an emergency session, the network will inform the user equipment on the emergency session for ensuring appropriate handling thereof.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**TITLE**

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METHOD AND SYSTEM FOR HANDLING A  
NETWORK-IDENTIFIED EMERGENCY SESSION

10

**FIELD AND BACKGROUND OF THE INVENTION**

The invention generally relates to the connection of  
emergency sessions such as emergency calls.

15

Emergency calls shall be supported in IP Multimedia networks  
(IMS). The UE (User Equipment) may usually be able to  
indicate in the initial session setup (e.g. in the INVITE  
message of SIP) that the session is an emergency session.

20

However, there may be situations where the initial session  
setup message is just sent with an ordinary number and there  
is no indication about the emergency. These situations may  
e.g. occur when a subscriber is roaming in another IMS  
network.

25

It is important to identify the intended emergency session as  
soon as possible, because the network and the UE need to  
perform some special actions for performing the emergency  
session.

30

**SUMMARY OF THE INVENTION**

The present invention provides method and system for enabling  
emergency sessions to be established in a reliable manner.

The invention provides a method and/or system as defined in the claims.

- 5 This invention discloses means and functions of how the network can detect an emergency session, how the UE can be informed about it and what effects this information has on later session setup.
- 10 The invention provides among others a Network-identification of an emergency session initiated by a session initiating entity such as a user equipment (UE) including mobile or stationary stations or terminals, or the like.
- 15 Even when the user equipment is unable to detect by itself that the initiated session is an emergency session, it is quickly informed thereon and can then initiate the appropriate steps for establishing the emergency session.
- 20 According to a first embodiment of the invention, in order to guarantee resources at the transport level for the emergency call, a response is sent back to the UE immediately after a control means such as P-CSCF has discovered that the session is an emergency session. When the UE receives such a response
- 25 it will perform a normal emergency session procedure, e.g. as defined in 3GPP specifications. To execute a normal emergency session, the UE will e.g. obtain or query location information and send it in the INVITE message and also the UE will activate an emergency PDP context for the session.
- 30 The invention enables to identify the session to be an emergency session as soon as possible so that the network and the UE can perform the necessary special actions for the emergency session as quickly as possible.

35

In one of the alternative implementations of the invention, the control entity such as P-CSCF does not respond immediately to UE when it has received an INVITE message from the UE but waits for the reception of a message, e.g. 183 Session Progress, from an emergency center or an intermediate network entity, and adds to that message the emergency information.

The information about the emergency call is not delayed at all, and the call establishment is continued in the conventional or any other manner such as with the 183 Session Progress message.

Sending an INVITE message takes remarkable radio resources and it is not preferable to send multiple INVITE messages. Actually there is no delay in session establishment, since UE has not yet started creating secondary PDP Context before UE receives the SDP message. This means that the indication can be included with high priority for the user plane. If no emergency centre is indicated, a default emergency center may be chosen.

This invention concerns a situation, in which PDP context activation can not or will not be performed at first when initiating a session for any reason, but a message such as an INVITE message is sent first from the UE to the CSCF.

Further details, aspects and advantages of the invention will become apparent from the following reference to specific embodiments and the attached drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a first embodiment of a method and system in

accordance with the present invention;

Fig. 2 shows a second embodiment of a method and system in accordance with the present invention;

5

Fig. 3 illustrates a third embodiment of a method and system in accordance with the present invention;

Fig. 4 shows an implementation for emergency session  
10 processing in a normal case.

#### DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

15 This invention discloses solutions to several problems such as:

- The UE is able to activate an emergency PDP context after it has been informed about the session characteristics. This is important to get high priority for the PDP context in the  
20 GPRS (General Packet Radio Service) and RAN (Radio Access Network).

- The UE sends location information after it is being informed about the session characteristics (it is assumed  
25 that location information is not sent in every INVITE message). The location information is used for selecting the most suitable Emergency Centre (EC).

Fig. 1 shows an embodiment of the invention which includes a  
30 call originating element, i.e. a session initiating element, such as a mobile station (UE) 10, and a network which comprises a serving network element such as a Serving GPRS Support Node (SGSN), and a further control element such as a Call State Control Function (CSCF) or Proxy Call State  
35 Control Function (P-CSCF) 11. The further network elements

necessary for completing an IP multimedia session such as a terminating element, a gateway node if needed, a subscriber information register such as a home location register (HLR) or home subscriber server (HSS), etc. are known to the skilled man and are therefore neither shown nor described in more detail. Generally, a MSC (Mobile Switching Centre, not shown) may return to UE a Call Proceedings message which contains a Priority information field defining also EC (Emergency Centre).

In all embodiments described above or below, the UE 1 may be equipped with a USIM (User Services Identity Module).

The embodiments shown in Figs. 1, 2, and 3 relate to a Network-identified emergency session.

A solution to guarantee resources at the transport level to perform the emergency call is to respond back to the UE immediately after a network entity, e.g. a control means such as P-CSCF 11, has discovered that the session is an emergency session. When the UE 10 receives the response, i.e. is informed, by the network, on the initiated session being an emergency session, it will perform normal emergency session procedure, e.g. as defined in 3GPP specifications.

Fig. 1 shows the solution at a general level.

In step 1, the UE 10 sends a session initiation message, e.g. an INVITE message of SIP (Session Initiation Protocol), which indicates an identifier, e.g. the E.164 number or LN (logical name), of the called entity, to the P-CSCF 11.

In a step 2, the P-CSCF 11 analyses the number or LN. When detecting that a normal session is to be initiated, a normal connection procedure is continued. When, however, the P-CSCF 11 discovers that the call is an emergency call, steps 3

to 6 shown in Fig. 1 are performed.

In step 3, a response is sent to the UE 10 indicating that the session is an emergency session.

Step 4: The UE 10 returns an acknowledgement message ACK  
5 to the P-CSCF 11.

In an optional step 5, the UE 10 may inform the user that the session is emergency session, e.g. by displaying an appropriate message on a display of the UE 10.

Then, a normal emergency session is executed (performed)  
10 as indicated by step 6. The execution of a normal emergency session means that the UE 10 will e.g. obtain location information and send it in the INVITE message and also that the UE 10 will activate an emergency PDP context for the session.

15

The response message at step 3 can be a new message, or an existing SIP message or other known message can be used. The information in the response message may be a new parameter in SIP protocol, but an existing parameter may also be used.

20

Fig. 2 shows a solution in which, in step 3, a SIP 302 message "Moved Temporarily" is used as response. The parameter value in the 302 message indicates that the session is an emergency session. The parameter may e.g. be "Contact:  
25 sip:emergency@visited.cscf.com". This value can e.g. be used in SIP URI when sending a new INVITE message to P-CSCF 11, or the UE 10 just generates a new INVITE message with the indication of an emergency session. Another alternative can be to use the SIP NOTIFY method.

30

Apart from the above discussion, the embodiment shown in Fig. 2 has the same structure and functioning as the one of Fig. 1.

35 Fig. 3 illustrates another embodiment of the invention. In



addition to the UE 10 and the P-CSCF 11, a Serving CSCF (S-CSCF) 12 and an Emergency Centre (EC) 13 are shown. The embodiment according to Fig. 3 provides an alternative functioning as compared to the embodiments of Figs. 1 and 2.

5

In order to achieve a very fast session establishment the P-CSCF 11 does not respond back to the UE 10 immediately after P-CSCF 11 has discovered that the session is an emergency session. On the contrary it continues session establishment and optionally, if possible, the P-CSCF 11 adds an indication of emergency session to the messages generated by P-CSCF 11 for ensuring high priority treatment of the messages.

The details of the procedure are shown in Fig. 3. Taking account of the nature of emergency session it is highly desirable not to add any additional delay also in case of abnormal situations to session establishment. By using the alternative of Fig. 3, it is possible to avoid the transfer of another INVITE message over the air interface, which is probably the largest and slowest message and thus very time-consuming.

The response message (in SIP, preferably a message "183 Progress") to the UE 10 preferably includes an indication of emergency session. This allows to activate an emergency PDP context for the session.

If there should not exist location information in S-CSCF 12 (or the relevant server) to select an emergency center 13, the S-CSCF 12 (or relevant server) will select an emergency center 13 without location information of the user (e.g. it selects a default emergency center, nearest emergency center or it may use some other technique to select the emergency center e.g. based on the address of P-CSCF 11.

35

As shown in Fig. 3, in step 1, the UE 10 initiates a session establishment and sends a session setup message, e.g. an INVITE message, to the P-CSCF 11. The P-CSCF 11 analyses the number or logical name (LN) of the called party/entity indicated in the session setup message, and discovers that the call is an emergency call. The P-CSCF 11 may add an indication of emergency session to the INVITE message (it is also possible that other elements add this indication of emergency session to the INVITE message).

In step 2, the INVITE message is forwarded to the S-CSCF 12.

In Step 3, the S-CSCF 12 selects an emergency center (EC) 13 and forwards the INVITE message to the EC 13.

Step 4: The EC 13 responds to the INVITE request by returning a response such as SIP 183 "Session Progress" to the S-CSCF 12. The subset of the media flows shown in steps 4 to 6 indicates that messages are returned back to originating endpoints proposing an EC 13 for providing support, or requesting the emergency session.

Step 5: The S-CSCF 12 forwards the response such as SIP 183 "Session Progress" back to the P-CSCF 11.

Step 6: The P-CSCF 11 forwards the response such as SIP 183 "Session Progress" back to the UE 10. The response includes the indication of emergency session. The UE 10 thus learns that this session is an emergency session and can act properly.

The circles and ovals shown in Fig. 3 mean "Emergency call detected, Possibility to add an emergency indication".

Fig. 4 presents a proposal for normal emergency session establishment for the case where the UE has USIM. It is assumed that the UE has activated a signalling PDP context to the GGSN in the visited PLMN.

5

In the following, the steps shown in Fig. 4 are described in more detail, referring to the step numbering of Fig. 4.

1. UE may request SAI (Service Area Identity) from SGSN.
- 10 2. SGSN sends response message to UE.
3. UE sends the SIP INVITE request, containing an initial SDP, to a P-CSCF determined via the CSCF discovery mechanism. Information about emergency call is sent in the INVITE message. UE includes the location information in  
15 the INVITE message.
4. P-CSCF detects that the call is an emergency call using the information in the INVITE message e.g. by analysing the number or name requested. P-CSCF selects a S-CSCF in the visited network and forwards the SIP INVITE request  
20 including the information about emergency call to S-CSCF.
5. S-CSCF uses the location information to select an appropriate EC. S-CSCF forwards the request to EC.
6. The media stream capabilities of the destination are returned along the signaling path.
- 25 7. S-CSCF forwards the message containing the destination SDP capabilities to P-CSCF.
8. P-CSCF authorizes the resources necessary for this session.
9. P-CSCF forwards the SDP message to the originating  
30 endpoint.
10. UE decides the final set of media streams for this

- session, and sends the Final SDP to P-CSCF.
11. P-CSCF forwards the final SDP to S-CSCF.
  12. S-CSCF forwards this message to EC.
  13. Activate PDP Context Request. The UE activates a PDP  
5 context for the emergency session by sending the Activate  
Secondary PDP Context Request message to the SGSN. The UE  
indicates that the PDP context is used for an emergency  
session. For the PDP context, the Allocation / Retention  
Priority shall be at once set to the high value.
  - 10 14. The SGSN, when recognising that the PDP context is for  
an emergency session, may itself request location  
information from SRNC, in order to receive updated or more  
accurate location information regarding the UE. SGSN  
thereafter sends a location report to Gateway Mobile  
15 Location services Centre (GMLC) as specified in TS 23.271,  
and the EC may obtain this location information from GMLC.
  15. Radio Access Bearer Setup
  16. Create PDP Context Request
  17. Create PDP Context Response
  - 20 18. Activate PDP Context Accept
  19. UE sends the "Resource Reservation Successful" message  
to the terminating endpoint, via the signaling path  
established by the INVITE message.
  20. P-CSCF forwards this message to S-CSCF.
  - 25 21. S-CSCF forwards this message to EC.
  22. Resources are reserved successfully.
  23. EC sends information about alerting to S-CSCF.
  24. S-CSCF forwards the Ringing message to P-CSCF.

25. P-CSCF forwards this message to UE.
26. EC answers the call and sends final 200 OK message to S-CSCF.
27. S-CSCF forwards final 200 OK message to P-CSCF.
- 5 28. P-CSCF indicates the resources reserved for this session should now be committed.
29. P-CSCF forwards final 200 OK message to UE.
30. UE starts the media flow for this session.
31. The calling party responds to the 200-OK final response  
10 with a SIP ACK message which is sent to P-CSCF.
32. P-CSCF forwards the SIP ACK message to S-CSCF
33. S-CSCF forwards the ACK message to EC.

Although the invention has been described above with  
15 reference to specific embodiments, the scope of protection of the invention intends to cover all modifications, omissions, additions and amendments of the disclosed features as well.

The teaching according to the invention is preferably  
20 implemented in an All-IP Network but may also be employed in networks of various other types, i.e. in IM, GPRS and UMTS domains.

**CLAIMS**

5

1. A method for establishing an emergency session in a communication system which includes at least one user equipment and one or more network entities involved in establishing an emergency session, wherein, when said user  
10 equipment initiates a session by sending a message to a network entity indicating an identifier of a called entity, one of said network entities analyses the received identifier, and, when detecting that the session to be initiated is an emergency session, an information is sent to  
15 the user equipment for informing the user equipment that the initiated session is an emergency session.-

2. A method of claim 1 comprising a further step wherein the user equipment initiates the execution of an emergency  
20 session upon receipt of said information sent to the user equipment for informing the user equipment that the initiated session is an emergency session.

3. Method according to claim 2, wherein the execution of  
25 the emergency session includes the step of obtaining location information of the user equipment and of sending the location information to one of the network entities.

4. Method according to claim 2 or 3, wherein the  
30 execution of the emergency session includes the step of activating an emergency PDP context for the session.

5. Method according to any one of the preceding claims,  
35 wherein the information returned to the user equipment is a

message, preferably a SIP (Session Initiation Protocol) message, which includes a parameter indicating an address of a network entity to be addressed for establishing an emergency session.

5

6. Method according to any one of the preceding claims, wherein the identifier of the called entity is the call number or logical name of the called entity.

10

7. Method according to any one of the preceding claims, wherein, when the network entity detects that the session to be initiated is an emergency session, an emergency center is informed on the emergency session to be established, and said information is returned to the user equipment only after receipt of a response from the emergency center, the emergency session then being established between the user equipment and the emergency center.

15

8. Method according to any one of the preceding claims, wherein the network entity analysing the received identifier is a Call State Control Function (CSCF).

20

9. A method for establishing an emergency session in a communication system which includes at least one user equipment and at least one call controlling network element involved in establishing an emergency session, wherein, when said user equipment initiates a session by sending a message to the call controlling network element indicating an identifier of a called entity, the call controlling network element analyses the received identifier, and, when detecting that the session to be initiated is an emergency session, an information is returned to the user equipment for informing the user equipment that the initiated session is an emergency session.

30

35

10. A method of claim 9, wherein the call controlling network element is a P-CSCF.

11. A method of claim 9 or 10, comprising a further step  
5 wherein the user equipment reinitiates the session by sending a message to the call controlling network element, the message comprising the said information.

12. A Method of claim 9 or 10, comprising a further step  
10 wherein the user equipment initiates a new session by sending a message to the call controlling network element the message comprising the said information.

13. A method of claims 11 or 12, comprising the further  
15 step of, in response to receiving the information, the network initiating the execution of the emergency session.

14. A method for establishing an emergency session in a communication system which includes at least one user  
20 equipment, at least one call controlling network element involved in establishing an emergency session, and an emergency center, wherein, when said user equipment initiates a session by sending a message to the call controlling network element indicating an identifier of a called entity,  
25 the call controlling network element analyses the received identifier, and, when detecting that the session to be initiated is an emergency session, the network element sends an information to the emergency center or to an intermediate network element for forwarding the information to the  
30 emergency center, said information informing the emergency center on the emergency session to be established, an indication of the emergency session being sent to the user equipment for informing the user equipment that the initiated session is an emergency session.

35



15. Method according to claim 14, wherein after receipt of a response from the emergency center, the emergency session is established between the user equipment and the emergency center.

5

16. A method of claim 14 or 15, wherein the call controlling network element is a P-CSCF.

10 17. A communication system for establishing an emergency session, the communication system including at least one user equipment and one or more network entities involved in establishing an emergency session, wherein

15 said user equipment is adapted to initiate a session by sending a message to a network entity indicating an identifier of a called entity,

one of said network entities is adapted to analyse the received identifier,

20 when detecting that the session to be initiated is an emergency session, said analysing network entity or another network entity is adapted to send an information to the user equipment for informing the latter that the initiated session is an emergency session.

25 18. A system according to claim 17, wherein the user equipment is adapted to initiate, when receiving the information that the initiated session is an emergency session, the execution of an emergency session.

30 19. System according to claim 18, wherein the execution of the emergency session includes the step of obtaining location information of the user equipment and of sending the location information to one of the network entities.

35 20. System according to claim 18 or 19, wherein the

execution of the emergency session includes the step of activating an emergency PDP context for the session.

21. System according to any one of the preceding system  
5 claims, wherein the information returned to the user equipment is a message, preferably a SIP (Session Initiation Protocol) message, which includes a parameter indicating an address of a network entity to be addressed for establishing an emergency session.

10

22. System according to any one of the preceding system claims, wherein the identifier of the called entity is the call number or logical name of the called entity.

23. System according to any one of the preceding system  
15 claims, wherein the network entity, when detecting that the session to be initiated is an emergency session, is adapted to inform an emergency center on the emergency session to be established, and to send said information to the user  
20 equipment only after receipt of a response from the emergency center, the emergency session then being established between the user equipment and the emergency center.

24. System according to any one of the preceding system  
25 claims, wherein the network entity analysing the received identifier is a Call State Control Function (CSCF).

25. A communication system for establishing an emergency  
session, the communication system including at least one user  
30 equipment and at least one call controlling network element involved in establishing an emergency session, wherein, when said user equipment initiates a session by sending a message to the call controlling network element indicating an identifier of a called entity, the call controlling network  
35 element is adapted to analyse the received identifier,

wherein, when detecting that the session to be initiated is an emergency session, to send an information to the user equipment for informing the user equipment that the initiated session is an emergency session.

5

26. A system of claim 25, wherein the call controlling network element is a P-CSCF.

27. A system of claim 25 or 26, wherein the user  
10 equipment is adapted to reinitiate the session by sending a message to the call controlling network element, the message comprising the said information.

28. A system of claim 25 or 26, wherein the user  
15 equipment is adapted to initiate a new session by sending a message to the call controlling network element, the message comprising the said information.

29. A system of claims 25 or 26, wherein the network is  
20 adapted to initiate the execution of the emergency session in response to receiving the information.

30. A communication system for establishing an emergency session, the communication system including at least one user  
25 equipment, at least one call controlling network element involved in establishing an emergency session, and an emergency center, wherein, when said user equipment initiates a session by sending a message to the call controlling network element indicating an identifier of a called entity,  
30 the call controlling network element is adapted to analyse the received identifier, and, when detecting that the session to be initiated is an emergency session, to send an information to the emergency center or to an intermediate network element for forwarding the information to the  
35 emergency center, said information informing the emergency

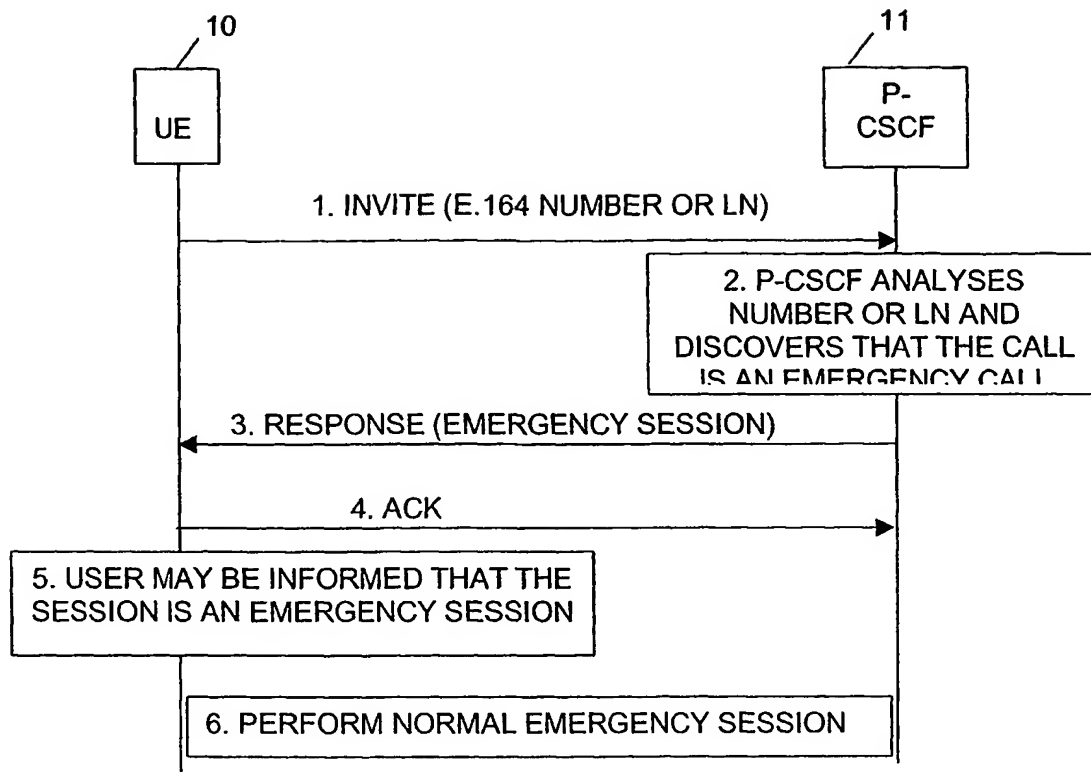
center on the emergency session to be established, an indication of the emergency session being sent to the user equipment for informing the user equipment that the initiated session is an emergency session.

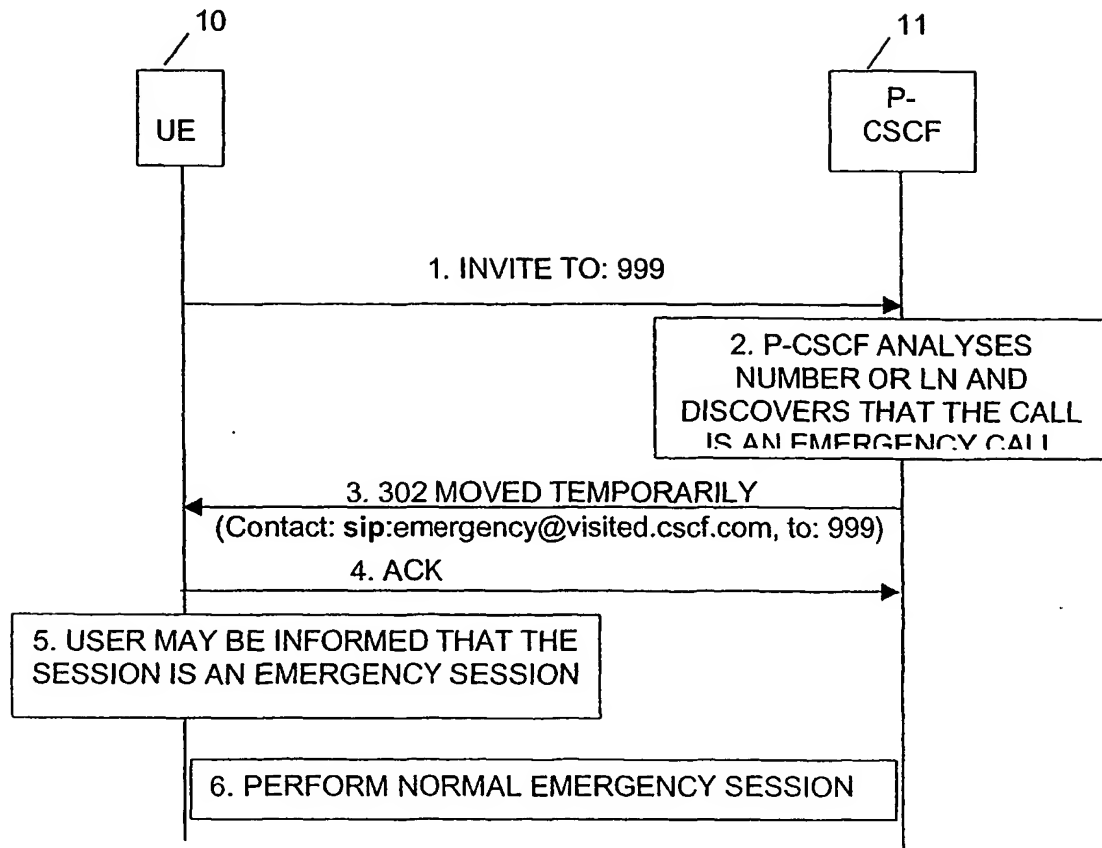
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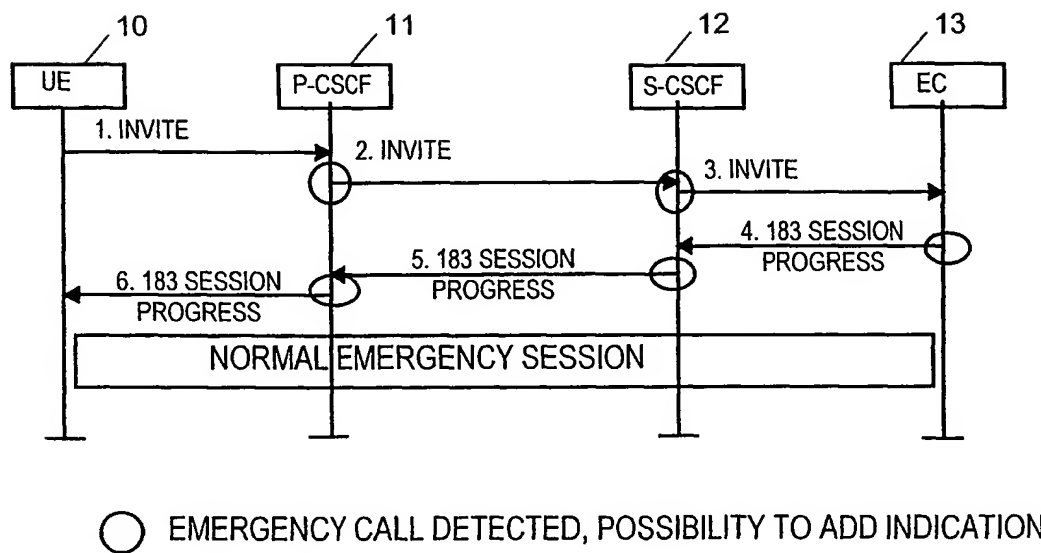
31. A system according to claim 30, wherein after receipt of a response from the emergency center, the emergency session is established between the user equipment and the emergency center.

10

32. A system of claim 31 or 32, wherein the call controlling network element is a P-CSCF.

**FIG. 1**

**FIG. 2**

**FIG. 3**

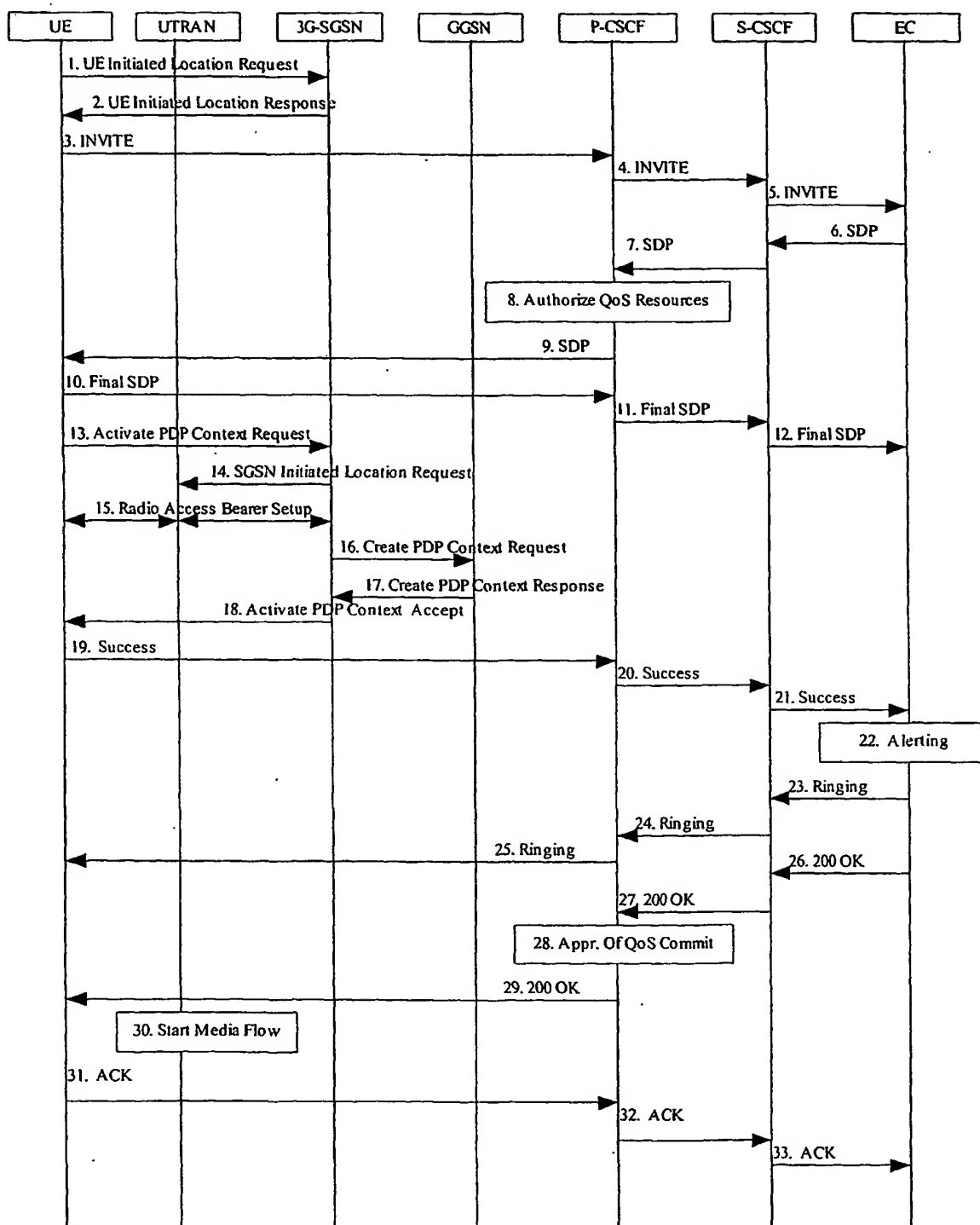


FIG. 4



# INTERNATIONAL SEARCH REPORT

Inter: I Application No

PCT/EP 01/04830

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04Q7/38 H04Q3/00 H04L29/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04Q H04M H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 92 16077 A (MOTOROLA INC) 17 September 1992 (1992-09-17) page 5, line 7-35 ---	1,9,14, 17,25,30
A	US 5 689 548 A (ALPEROVICH VLADIMIR ET AL) 18 November 1997 (1997-11-18) column 4, line 8 -column 6, line 49 ---	1,9,14, 17,25,30
A	MOH M ET AL: "Mobile IP telephony: mobility support of SIP" PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON COMPUTER COMMUNICATIONS AND NETWORKS, XX, XX, 11 October 1999 (1999-10-11), pages 554-559, XP002143545 the whole document --- -/--	1,9,14, 17,25,30

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

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\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search

6 December 2001

Date of mailing of the international search report

12/12/2001

Name and mailing address of the ISA

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# INTERNATIONAL SEARCH REPORT

Int:                      if Application No  
PCT/EP 01/04830

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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